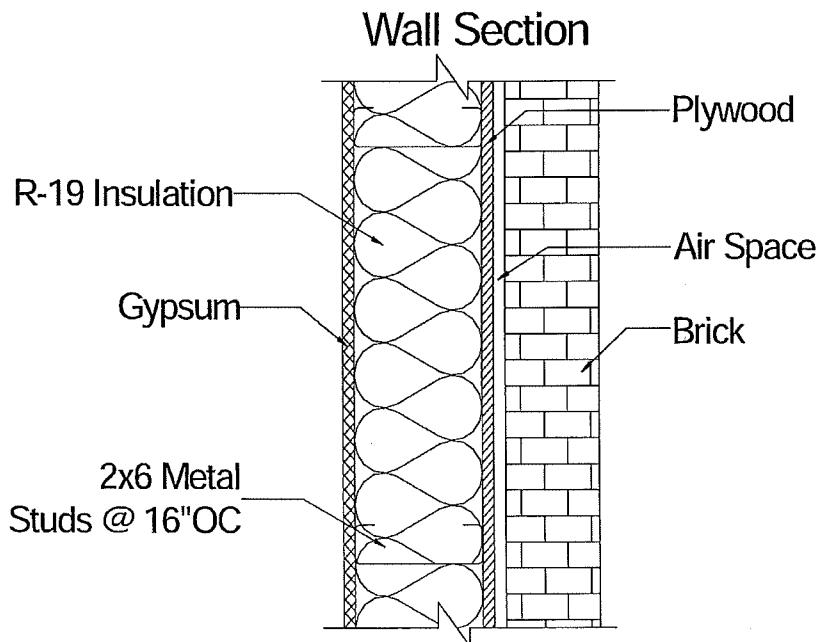


Envelope Component U-factor Calculation

Example – Metal Framing

Element	R-value
Inside Air Film	0.68
½" GWB	0.45
Cavity, 2x6, 16" OC, R-19*	7.10
½" Plywood Sheathing	0.62
½" Air Space	0.90
4" Brick	1.20
Outside Air Film	0.17
Total R-value	11.12

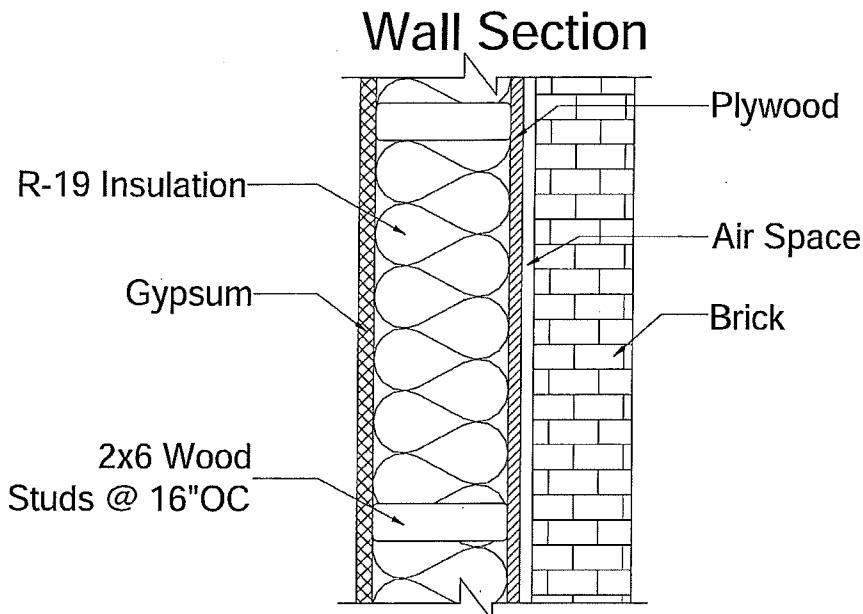


* See WSEC, Table 10-5A for metal framing R-Values

U-factor =	$\frac{1}{R} = \frac{1}{11.12} = 0.09$
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Envelope Component U-factor Calculation

Example – Wood Framing



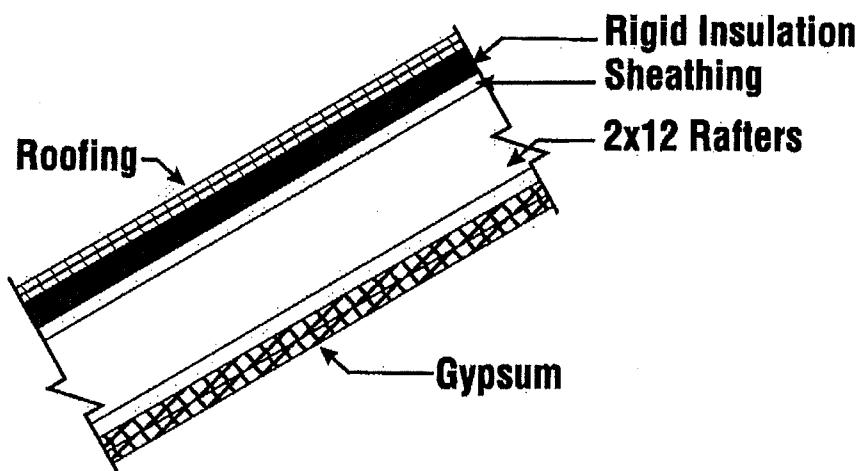
Between Framing		At Framing	
Element	R-value	Element	R-value
Inside Air Film	0.68	Inside Air Film	0.68
½" GWB	0.45	1/2" GWB	0.45
R-19 Insulation	19.00	2X6 Stud @ 16" O.C.	5.61
½" Plywood Sheathing	0.62	½" Plywood Sheathing	0.62
1/2" Air Space	0.90	1/2" Air Space	0.90
4" Brick	1.20	4" Brick	1.20
Outside Air Film	0.17	Outside Air Film	0.17
Total R-value	23.02	Total R-value	9.63
Framing Percentage			18%

U-factor =	$\frac{\text{Insulation Fraction}^*}{\text{Insulation R-value}}$	+	$\frac{\text{Framing Fraction}^*}{\text{Framed R-value}}$
U-factor =	$\frac{0.82}{23.02}$	+	$\frac{0.18}{9.63} = 0.054$
* Use cavity ratio in WSEC (Section #2005.2)			

Envelope Component U-factor Calculation

Example – Wood Framed Roof

Roof Section



Between Framing		At Framing	
Element	R-value	Element	R-value
Inside Air Film	0.61	Inside Air Film	0.61
2 layers 1/2" GWB	0.90	2 layers 1/2" GWB	0.90
12" Air Space	0.91	2" x 12" wood rafters @ 24" O.C.	12.00
5/8" Plywood Sheathing	0.77	5/8" Plywood Sheathing	0.77
Rigid Insulation	21.50	Rigid Insulation	21.50
Composite Shingle Roof	0.44	Composite Shingle Roof	0.44
Outside Air Film	0.17	Outside Air Film	0.17
Total R-value	25.30	Total R-value	39.39
Framing Percentage			13%

U-roof =	<u>Insulated Fraction</u> Insulated R-value	+	<u>Framed Fraction</u> Framed R-value
U-roof =	<u>0.87</u> 25.30	+	<u>0.13</u> 36.39